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# **FINAL REPORT**

*Covering the Period*

February 1, 1988 - September 30, 1989  
(with an extension to September 30, 1990)

Sponsored by

**DARPA AND ONR**

CONTRACTOR:	The Board of Trustees of the Leland Stanford Junior University
GRANT:	N00014-88-J-1200
PRINCIPAL INVESTIGATOR:	Professor I. Lindau
TITLE OF WORK:	Beam Line and Associated Work

DECEMBER 1990

## ABSTRACT

This is the final report of the operational phase 1988-89 of the DOD supported beam line at the Stanford Synchrotron Radiation Laboratory, including an extension to September 1990. The most important accomplishments during this period were: (1) the complete and successful commissioning of the high-resolution monochromator; and (2) research programs in diamond technology and MBE grown semiconductor structures.

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## FINAL REPORT

This is the final report of the operational phase 1988-89 of the DOD supported beam line at the Stanford Synchrotron Radiation Laboratory (SSRL), including an extension to September 1990. SSRL has had very little operating time during this period: 10 weeks in January-March 1989 with poor beam conditions and 4 weeks in April 1990 with excellent beam conditions.

In the final report for the first phase of the beam line operation covering 1985-1988 (contract N00014-85-K-0388, dated August 1988), we gave a very detailed report on the technical status of the beam line. We refer to this report for further details. The most important technical accomplishment since then is the complete and successful commissioning of the high resolution monochromator. This means that the entire beam line, i.e., the multi-undulator insertion device, the beam extraction system, the monochromator, and the experimental end station, is now fully operational to the specifications given in the original design. A lengthy paper describing the entire beam line, including test performance, is in preparation and will be completed shortly. The most recent published paper, entitled "Multi-Undulator Beam Line V at SSRL: A Progress Report," by R. Z. Bachrach, R. D. Bringans, L. E. Swartz, I. Lindau, B. B. Pate, R. G. Carr, N. Hower, B. Youngman, H. Morales, and P. Pianetta is published in Nucl. Instrum. Meth. A 266, 83 (1988).

In the four weeks of available beam time in April 1990, the beam line was used for research in two different programs: (1) electronic properties of molecular beam-epitaxially grown semiconductor structures, supported by ONR, and (2) diamond technology, supported by ONR/SDIO. The former research program is under the leadership of Drs. V. Rehn and J. Erickson of the Naval Weapons Center, China Lake, and the latter is under the

leadership of Prof. B. B. Pate, University of Washington, Pullman, and Prof. I. Lindau, Stanford University.

We want to conclude by emphasizing that the DOD supported multi-undulator beam line is now operating at its design specifications and that it will be an outstanding research facility in the years to come. The lack of beam time at SSRL during the last five years has been a severe hindrance in using its potential. This problem will hopefully be past history, since the SPEAR storage ring is now (since October 1990) fully dedicated to synchrotron radiation research.